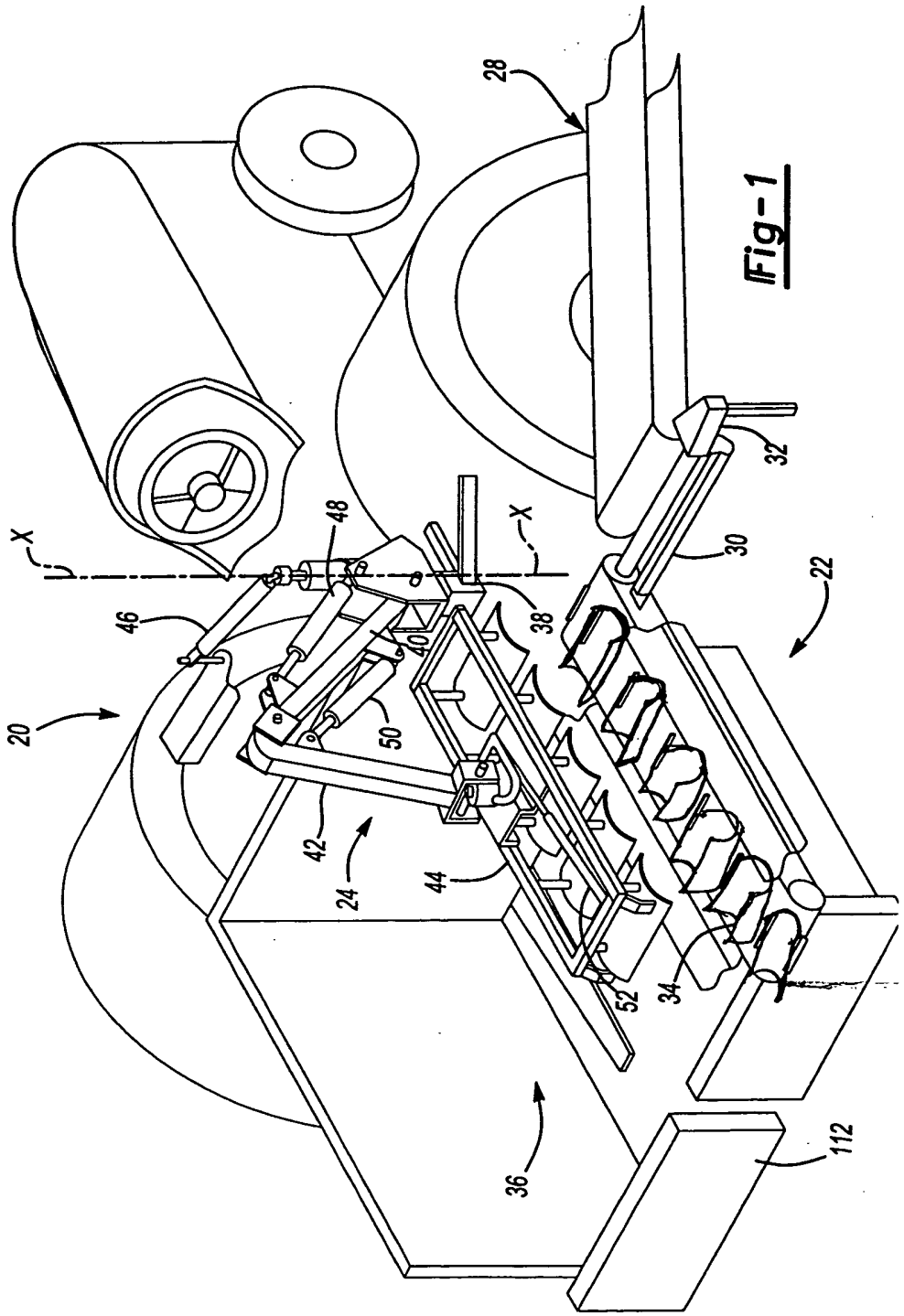
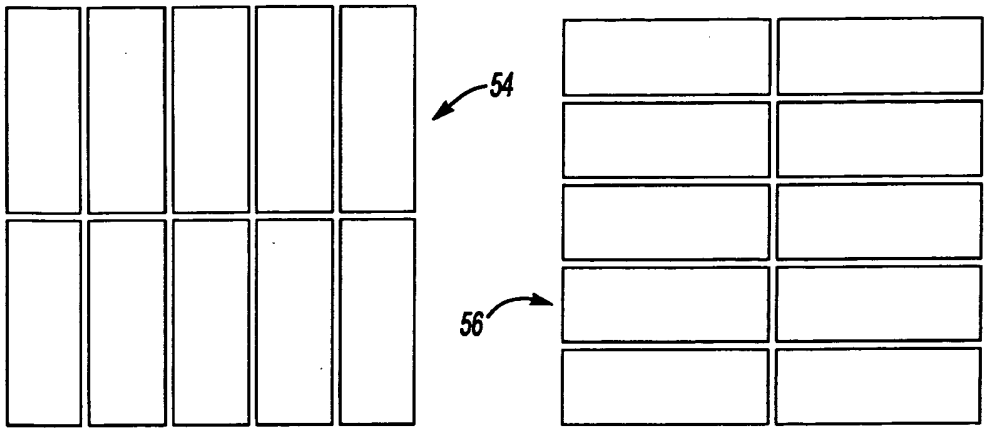


Fig-1



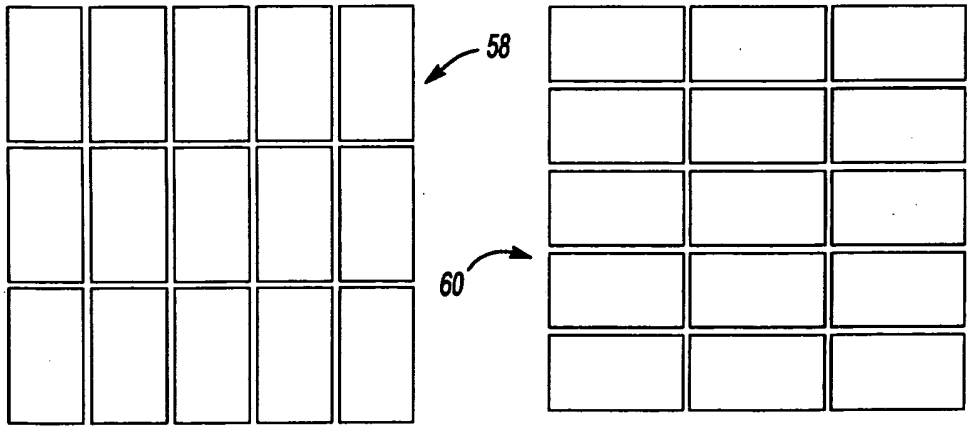


Fig-2

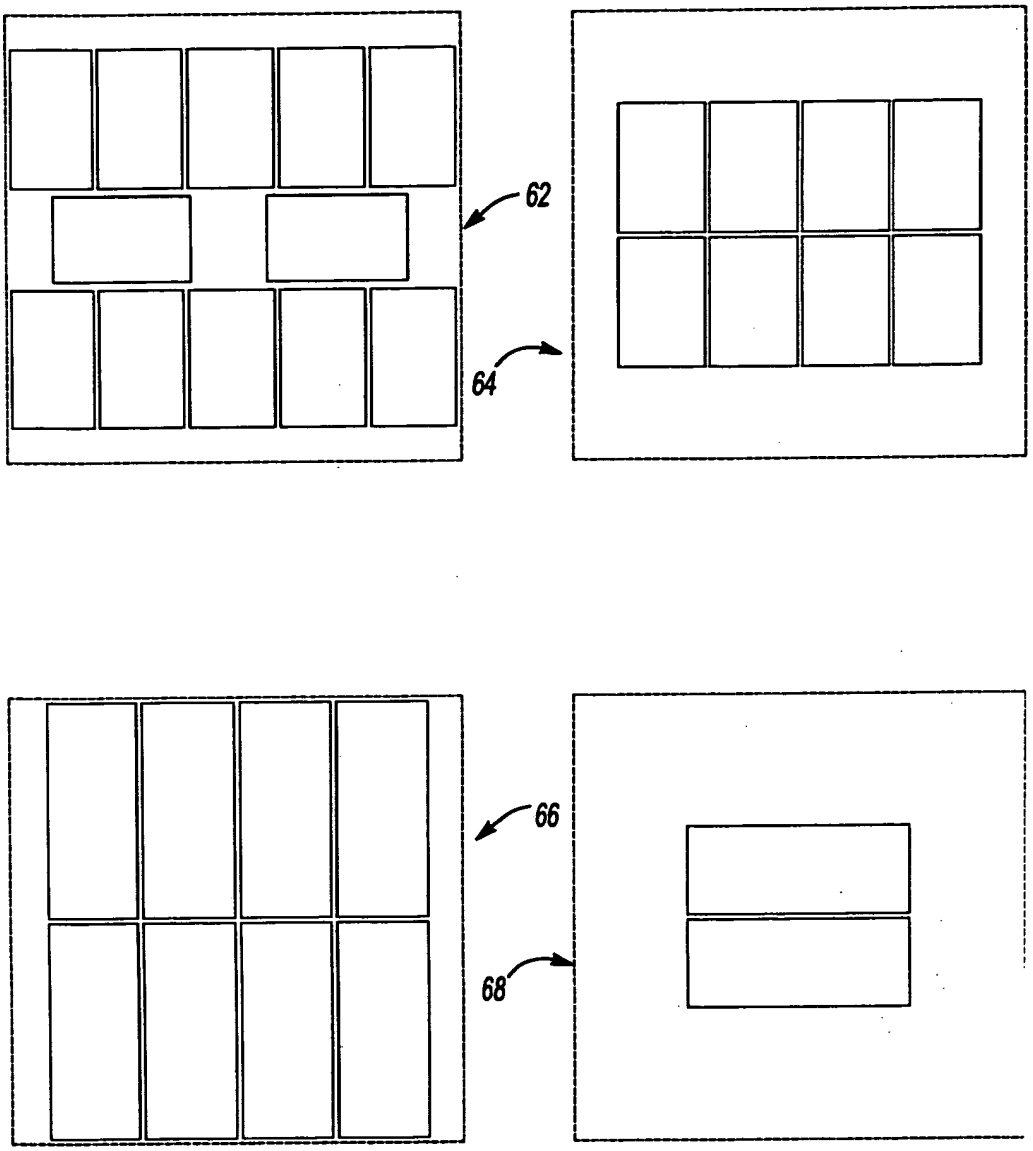


Fig-3

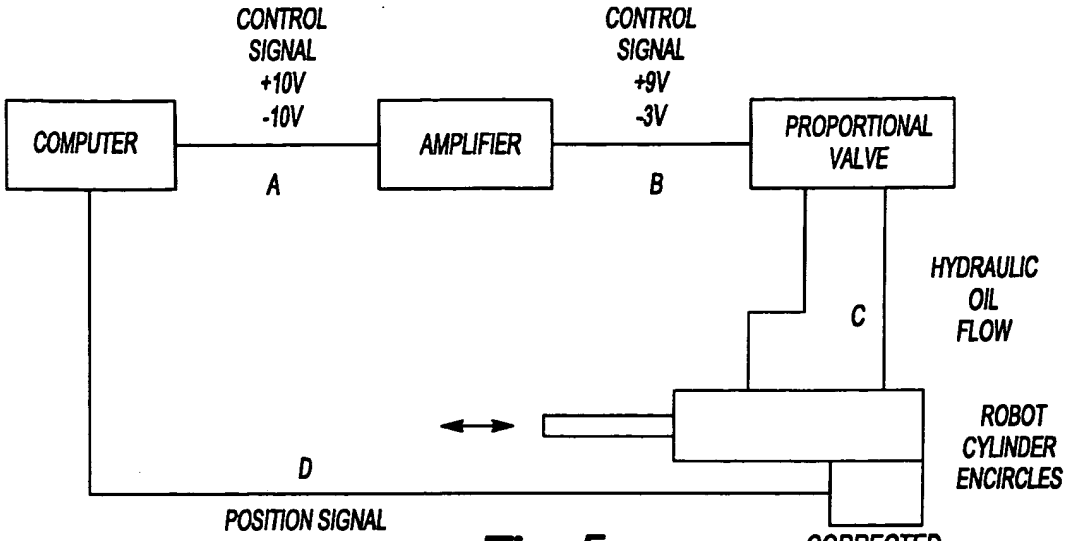

CONTROL SIGNAL +10V -10V
CONTROL SIGNAL +9V -3V
COMPUTER
AMPLIFIER
PROPORTIONAL VALVE
A
B
C
HYDRAULIC OIL FLOW
ROBOT CYLINDER ENCIRCLES
D
POSITION SIGNAL
CORRECTED

Fig-5

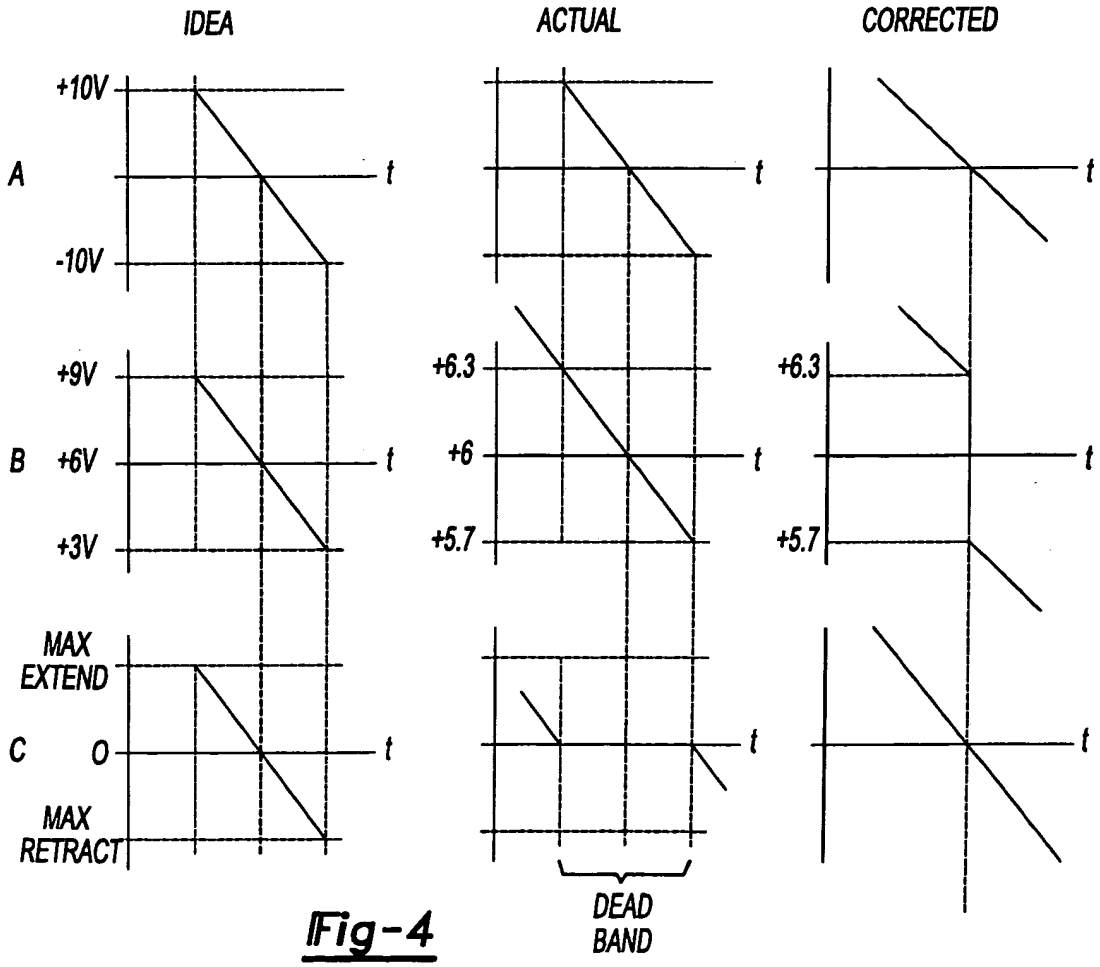

IDEA
ACTUAL
CORRECTED
+10V
A
-10V
t
+9V
B
+6V
+3V
MAX EXTEND
C
O
MAX RETRACT
+6.3
+6
+5.7
DEAD BAND

Fig-4

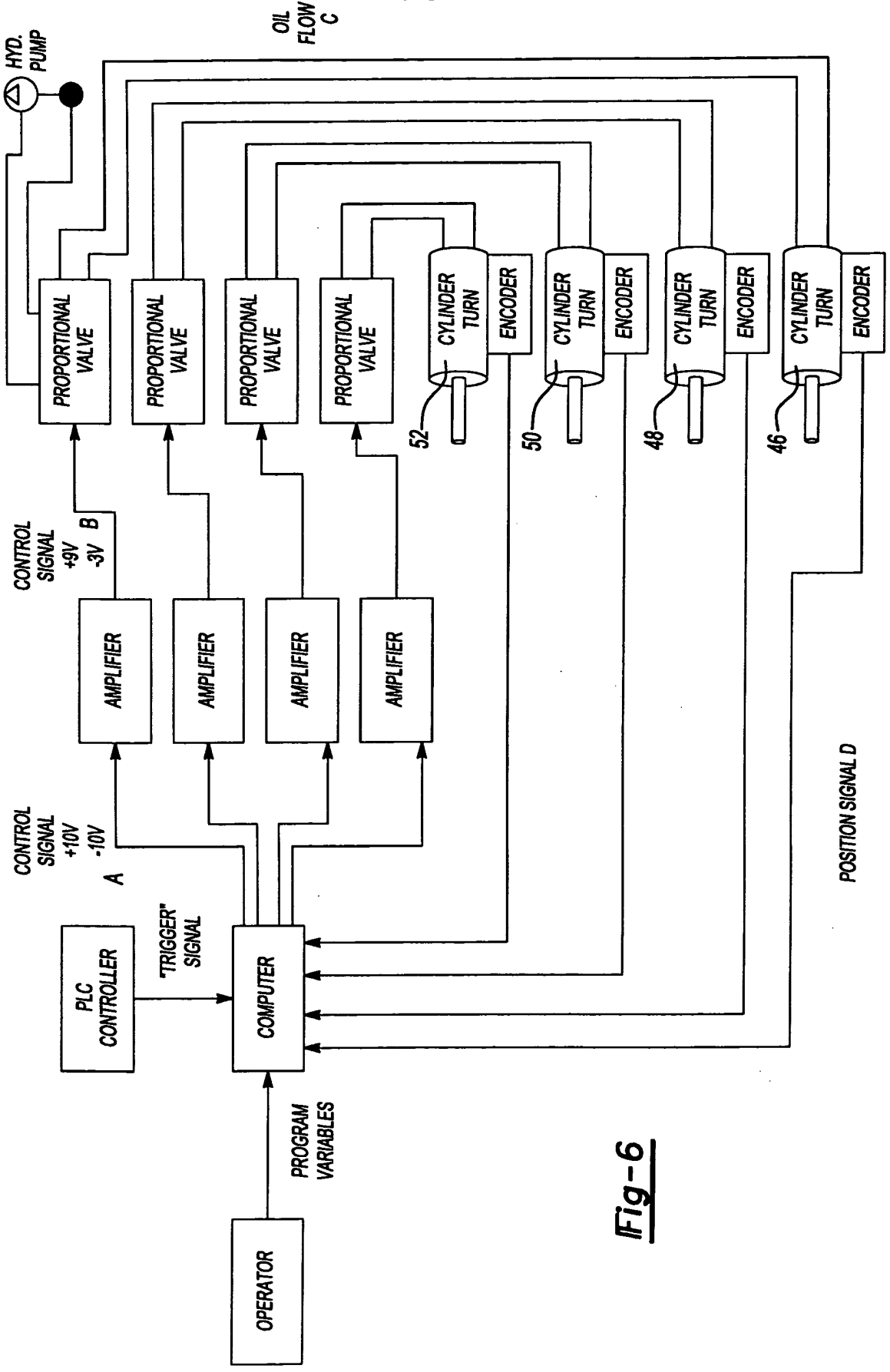

HYD. PUMP
OIL FLOW C
PROPORTIONAL VALVE
PROPORTIONAL VALVE
PROPORTIONAL VALVE
PROPORTIONAL VALVE
CYLINDER TURN
ENCODER
CYLINDER TURN
ENCODER
CYLINDER TURN
ENCODER
CYLINDER TURN
ENCODER
52
50
48
46
CONTROL SIGNAL +9V -3V B
AMPLIFIER
AMPLIFIER
AMPLIFIER
AMPLIFIER
CONTROL SIGNAL +10V -10V A
POSITION SIGNAL D
PLC CONTROLLER
"TRIGGER" SIGNAL
COMPUTER
PROGRAM VARIABLES
OPERATOR

Fig-6

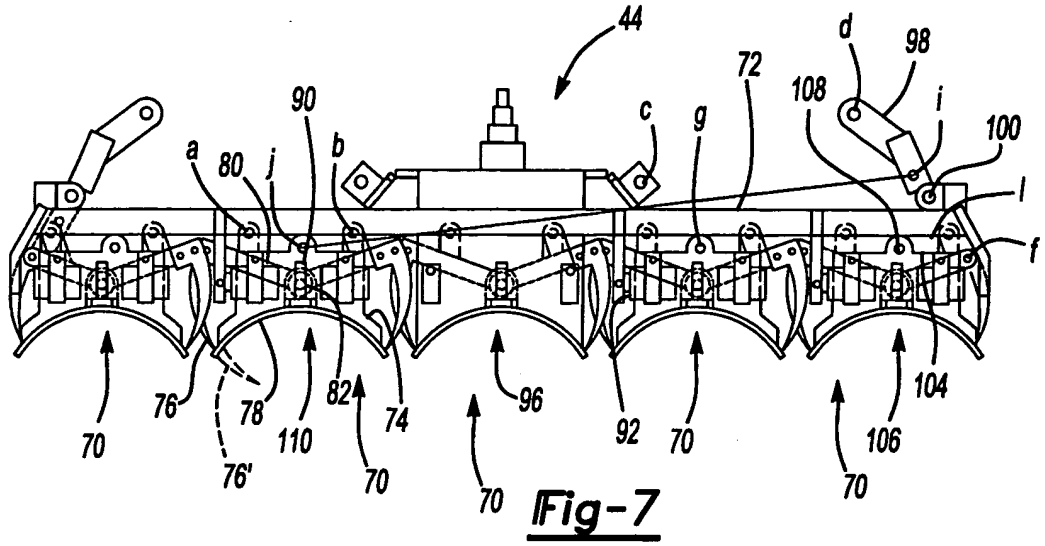


Fig-7

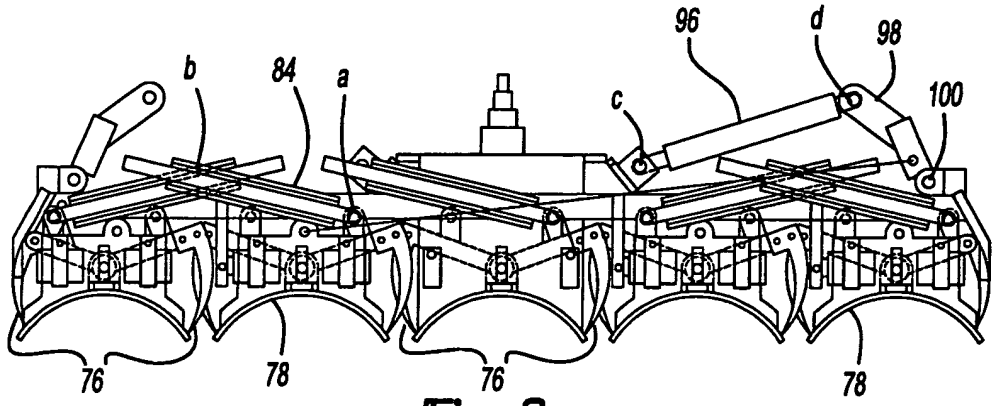


Fig-8

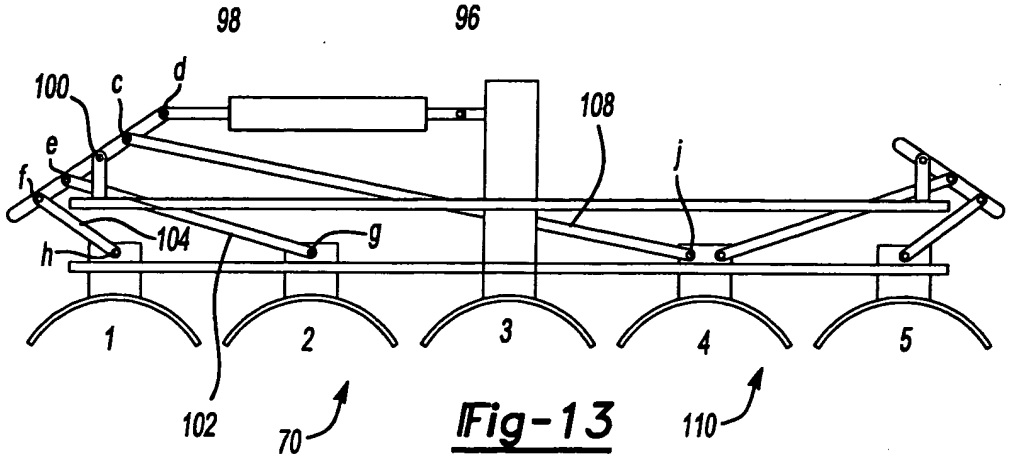


Fig-13

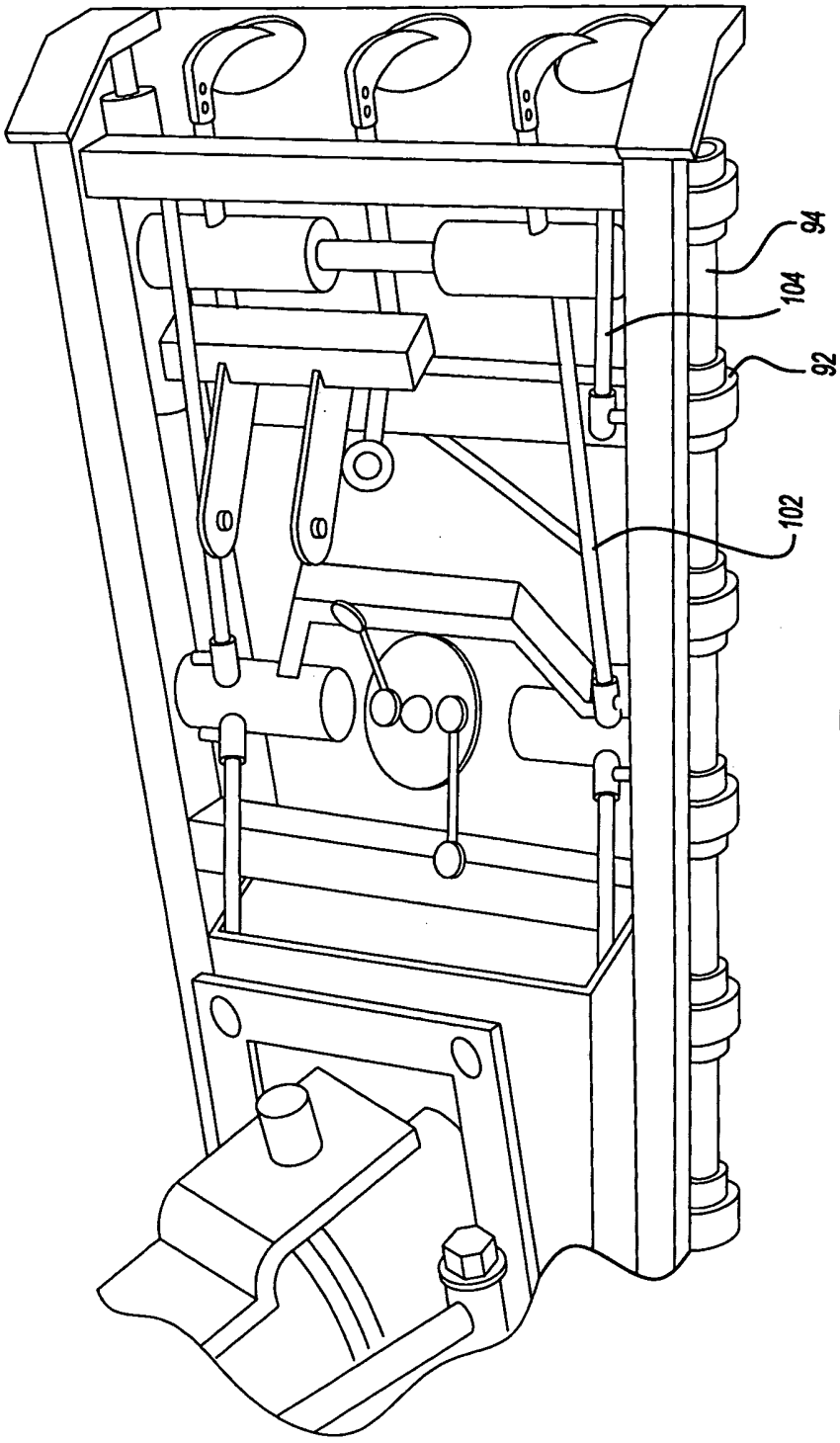


Fig-9

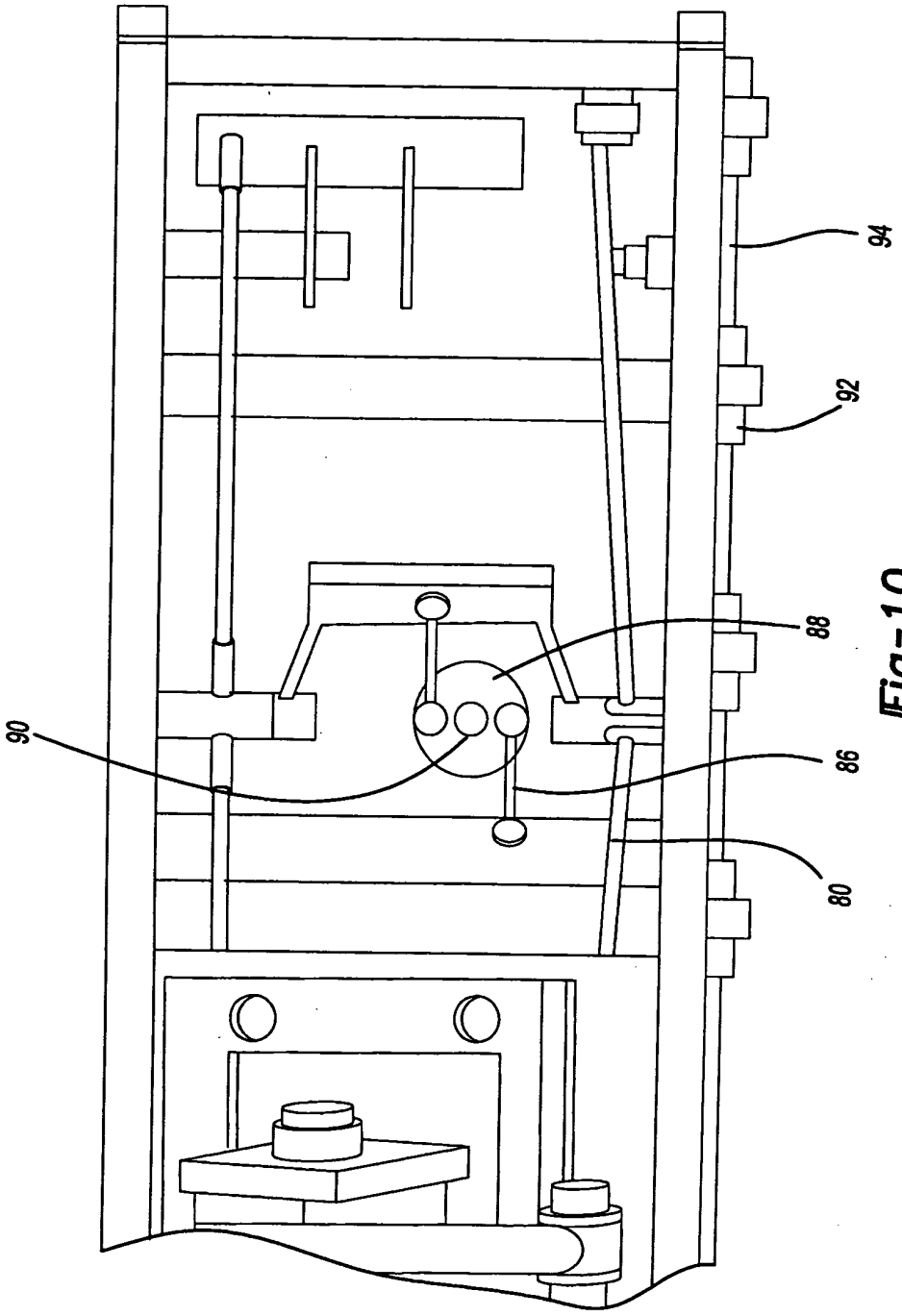


Fig-10

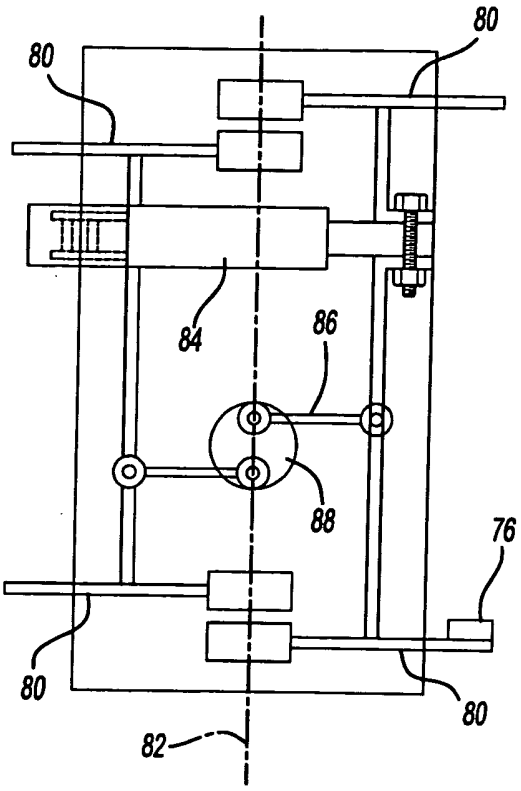


Fig-11

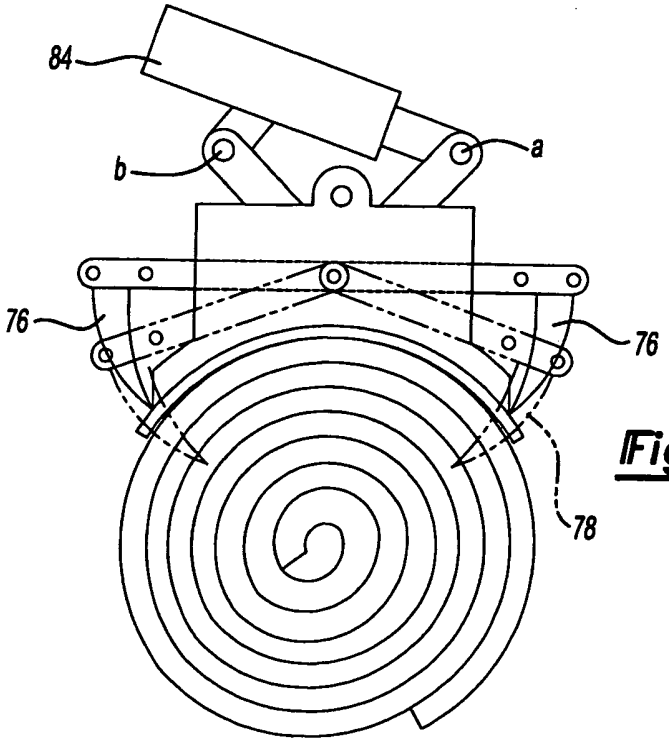
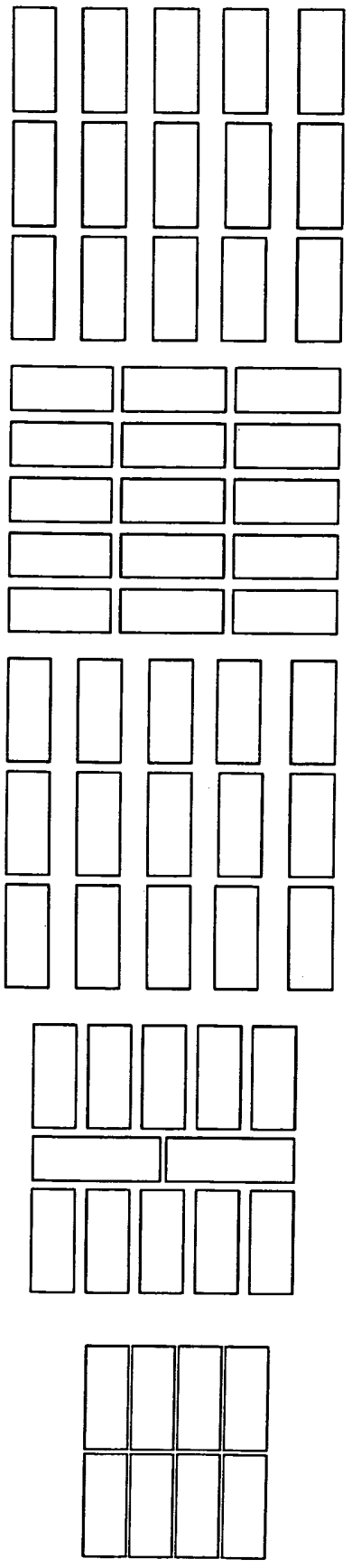


Fig-12



80 ROLLS PER PALLET

1ST LAYER 15 ROLLS

2ND LAYER 15 ROLLS

3RD LAYER 15 ROLLS

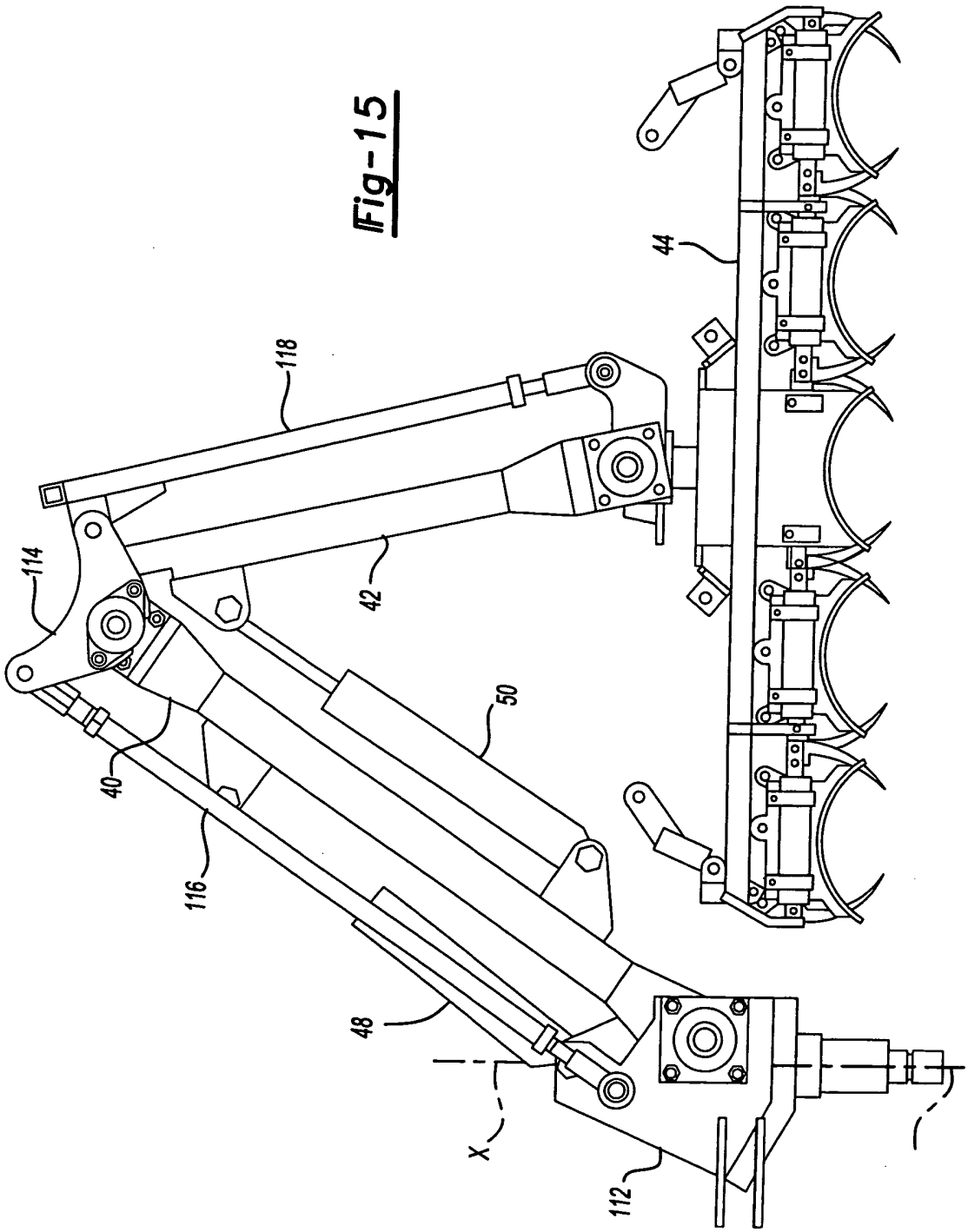
4TH LAYER 12 ROLLS

5TH LAYER 8 ROLLS

80 TOTAL

Fig-14

Fig-15



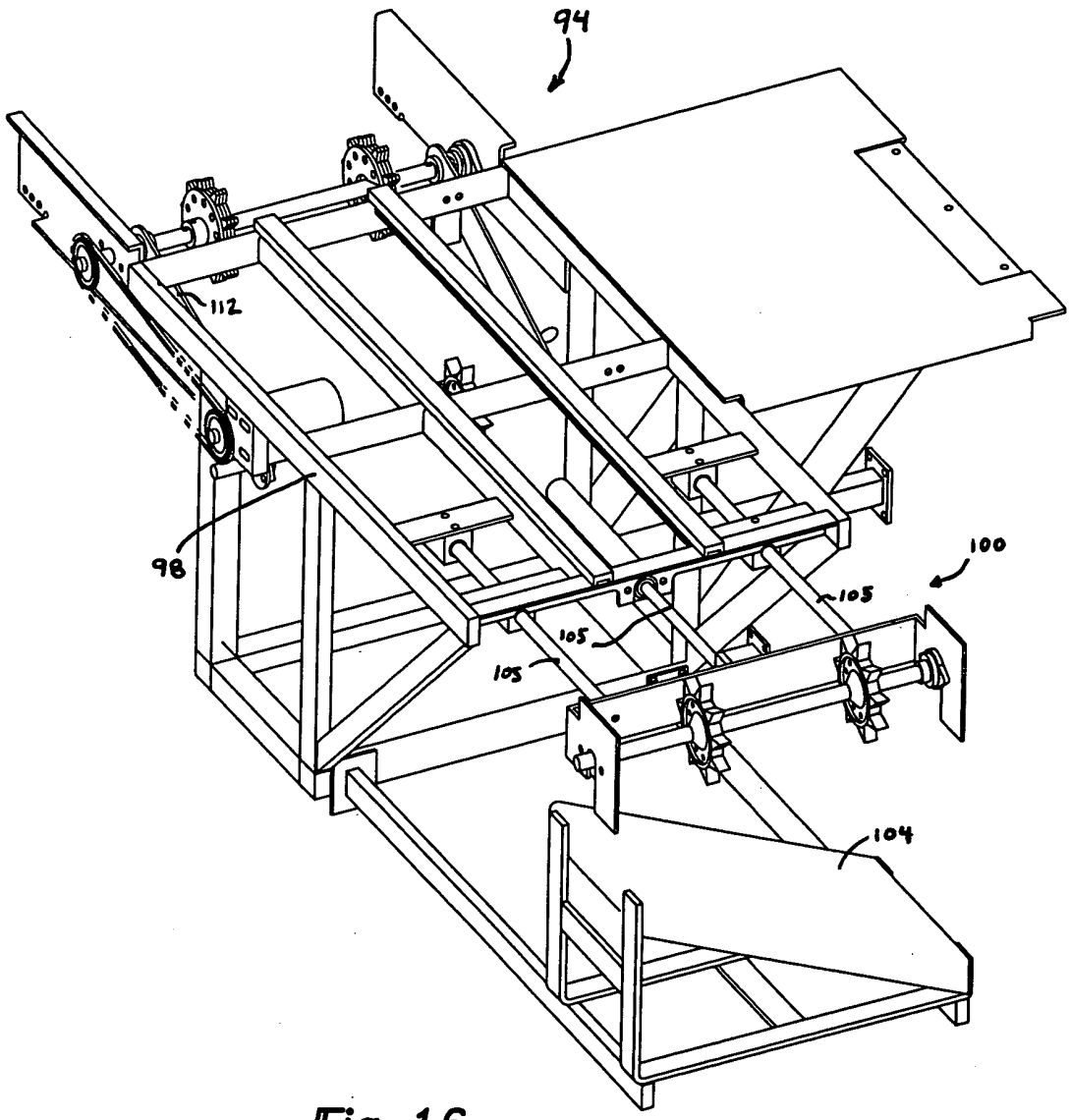


Fig-16

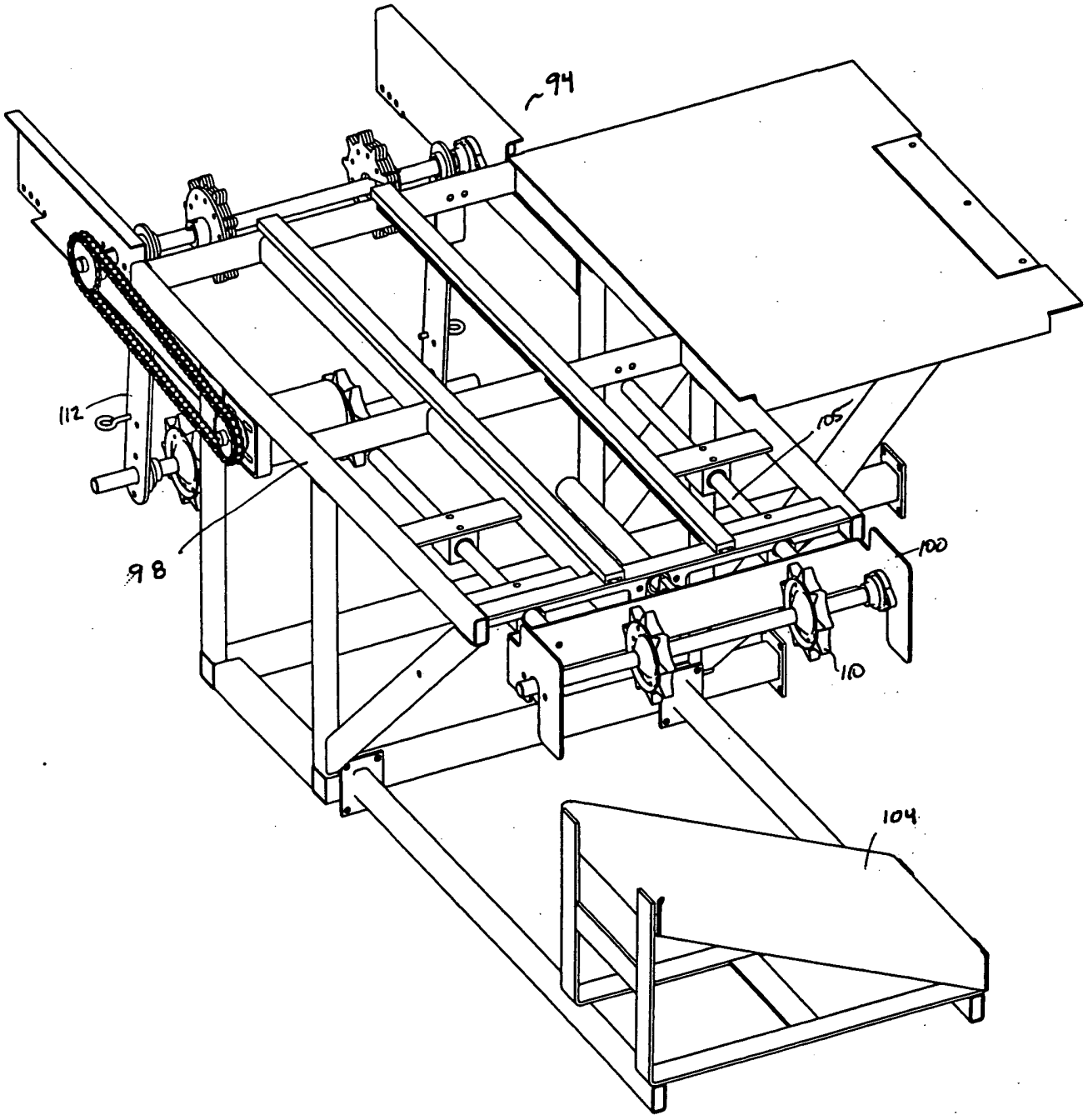


Figure 17

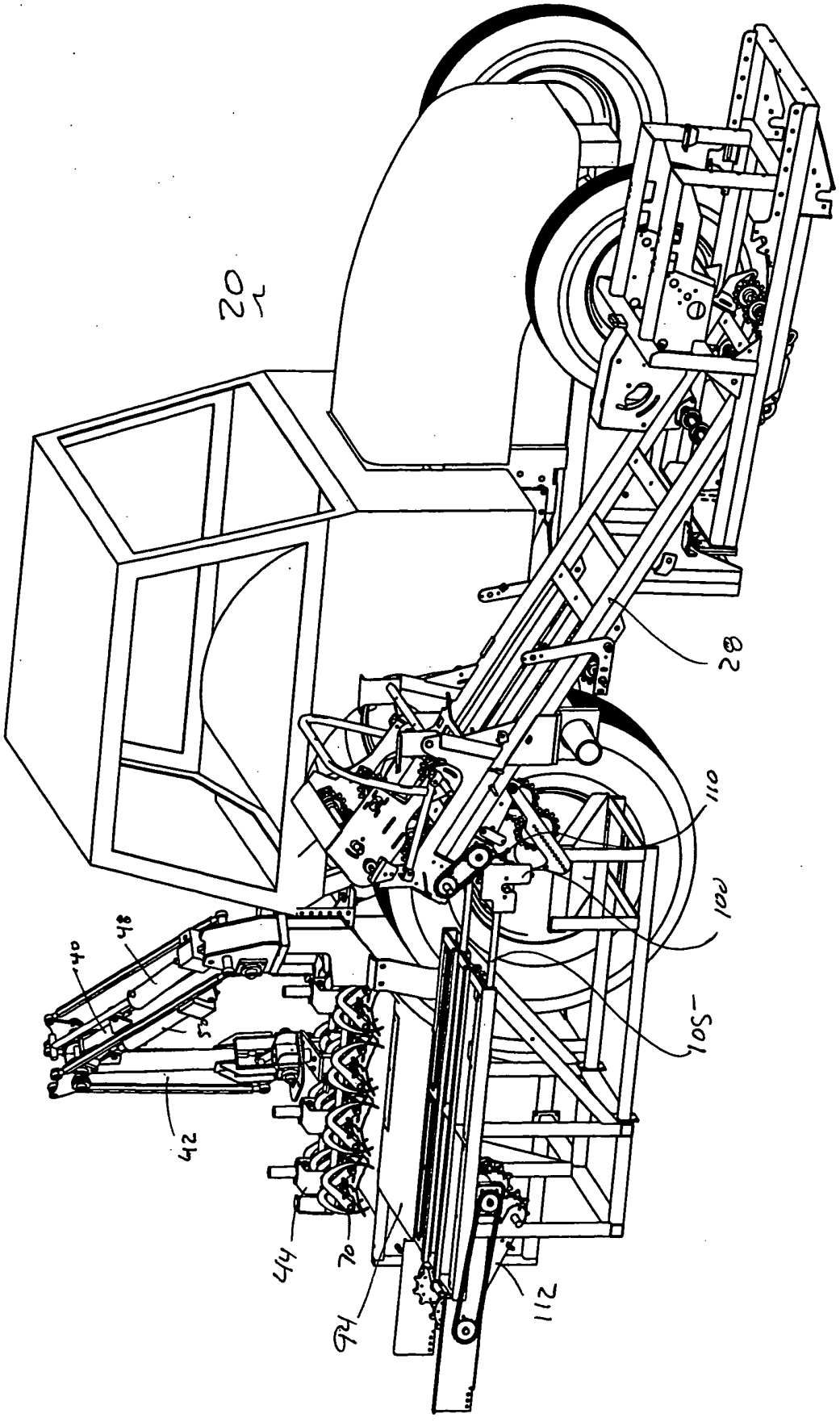


Figure 18

Figure 19a

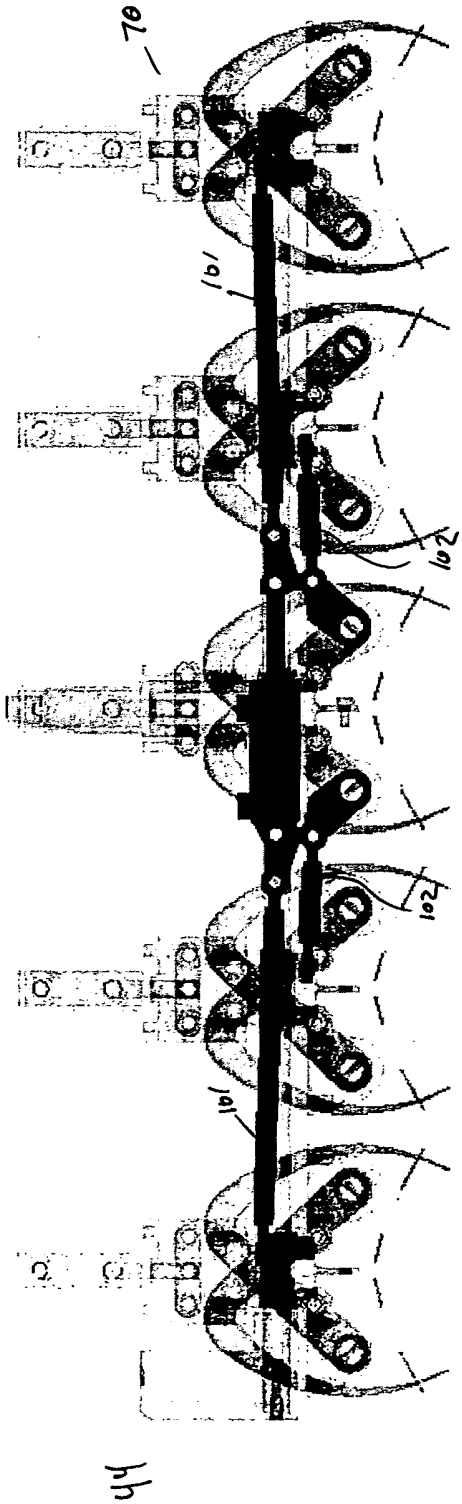
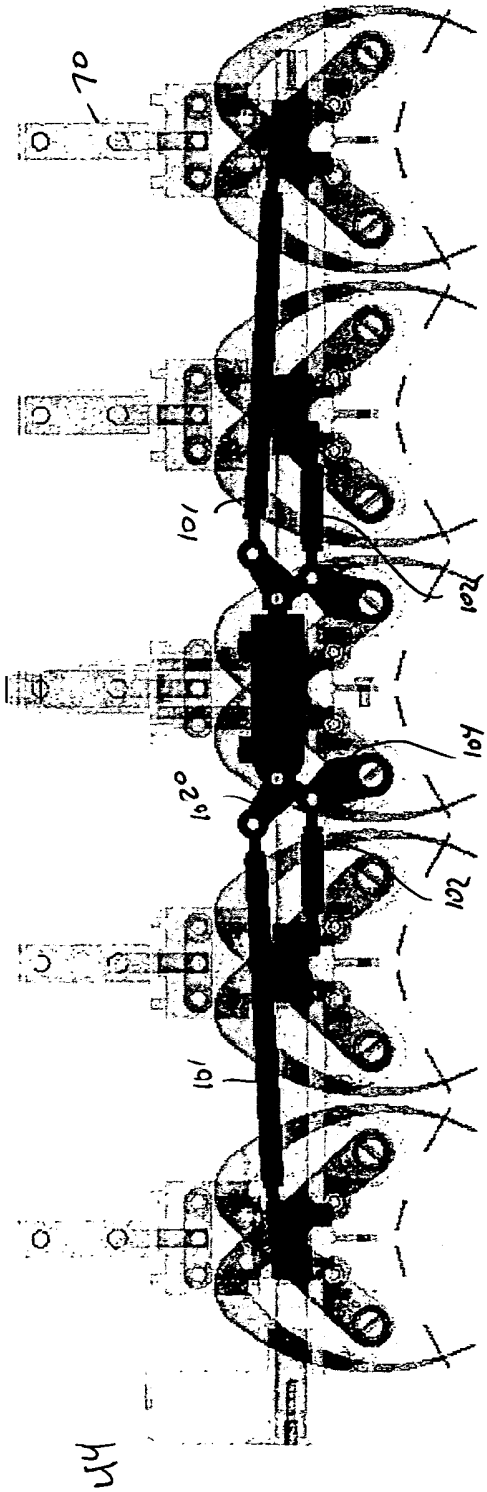


Figure 19b



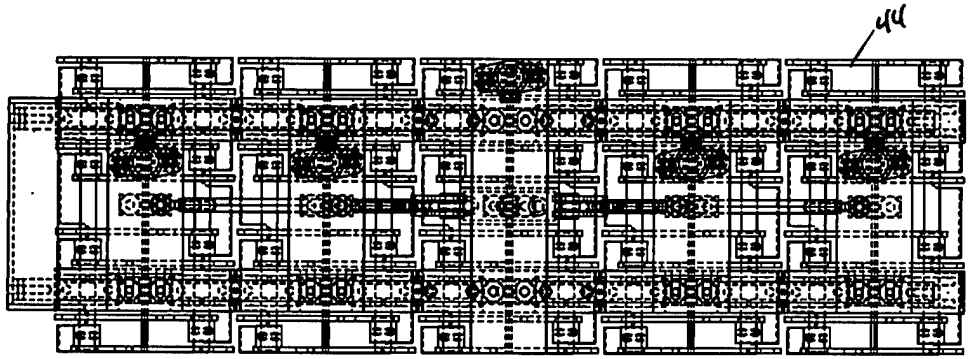


Fig 20e

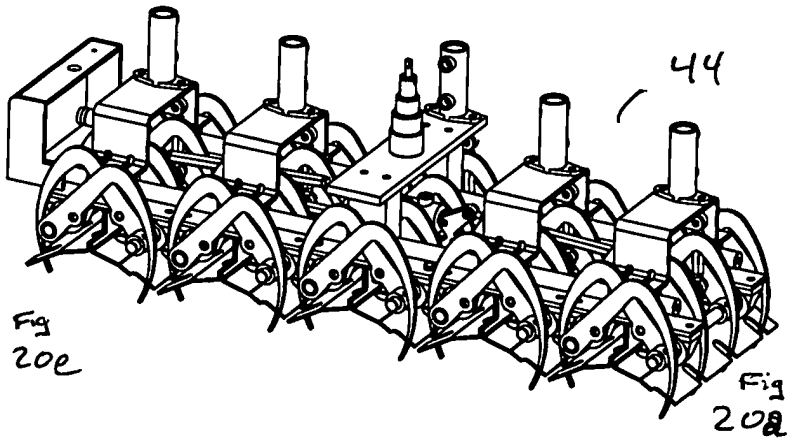


Fig 20a

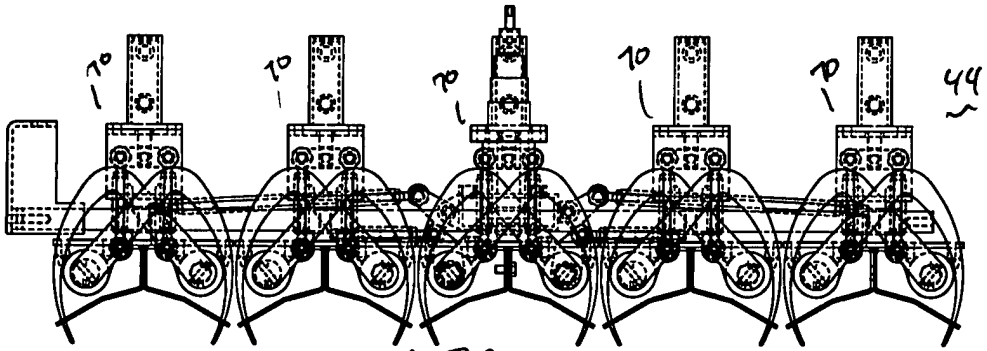


Fig 20c

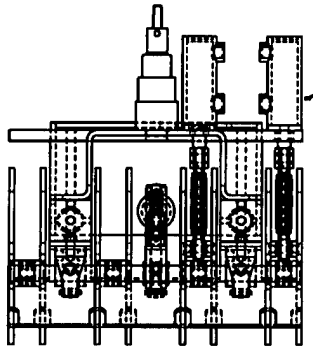


Fig 20b

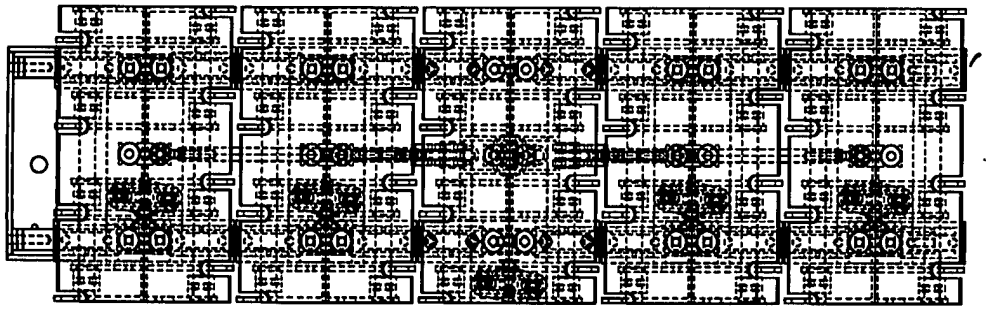


Fig 20d

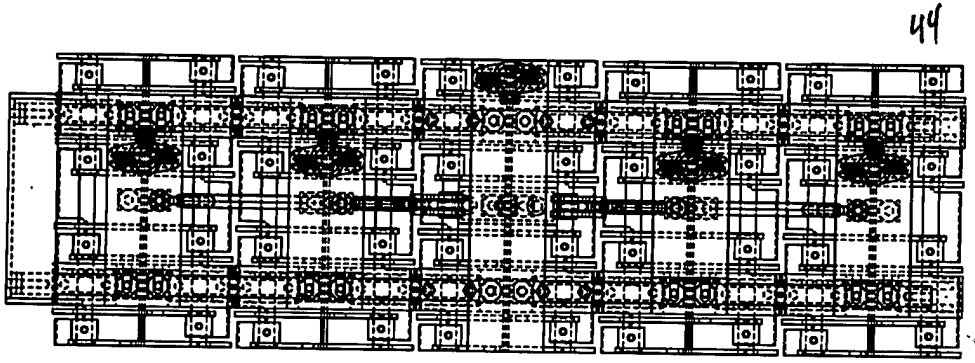


Fig 21e

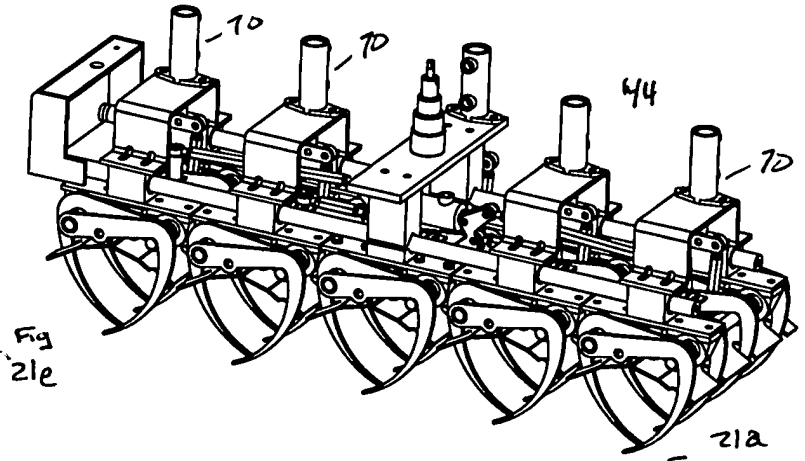


Fig 21a

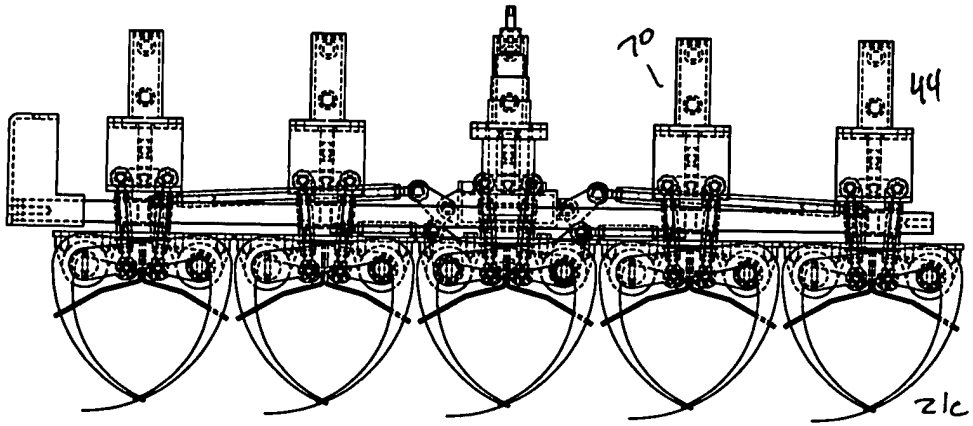


Fig 21c

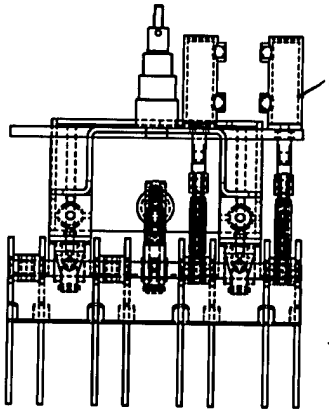


Fig 21b

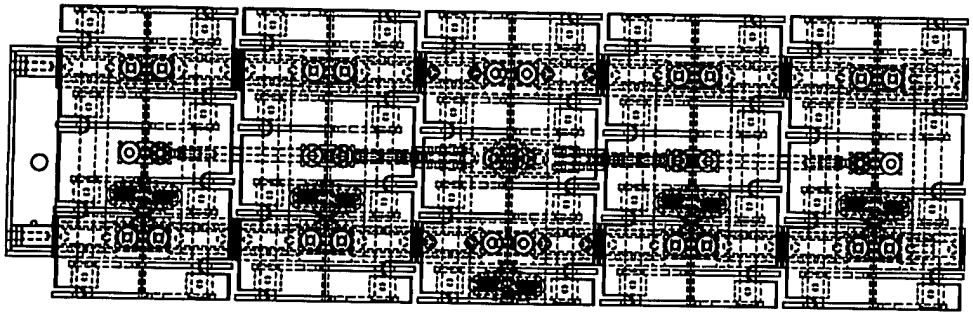


Fig 21d

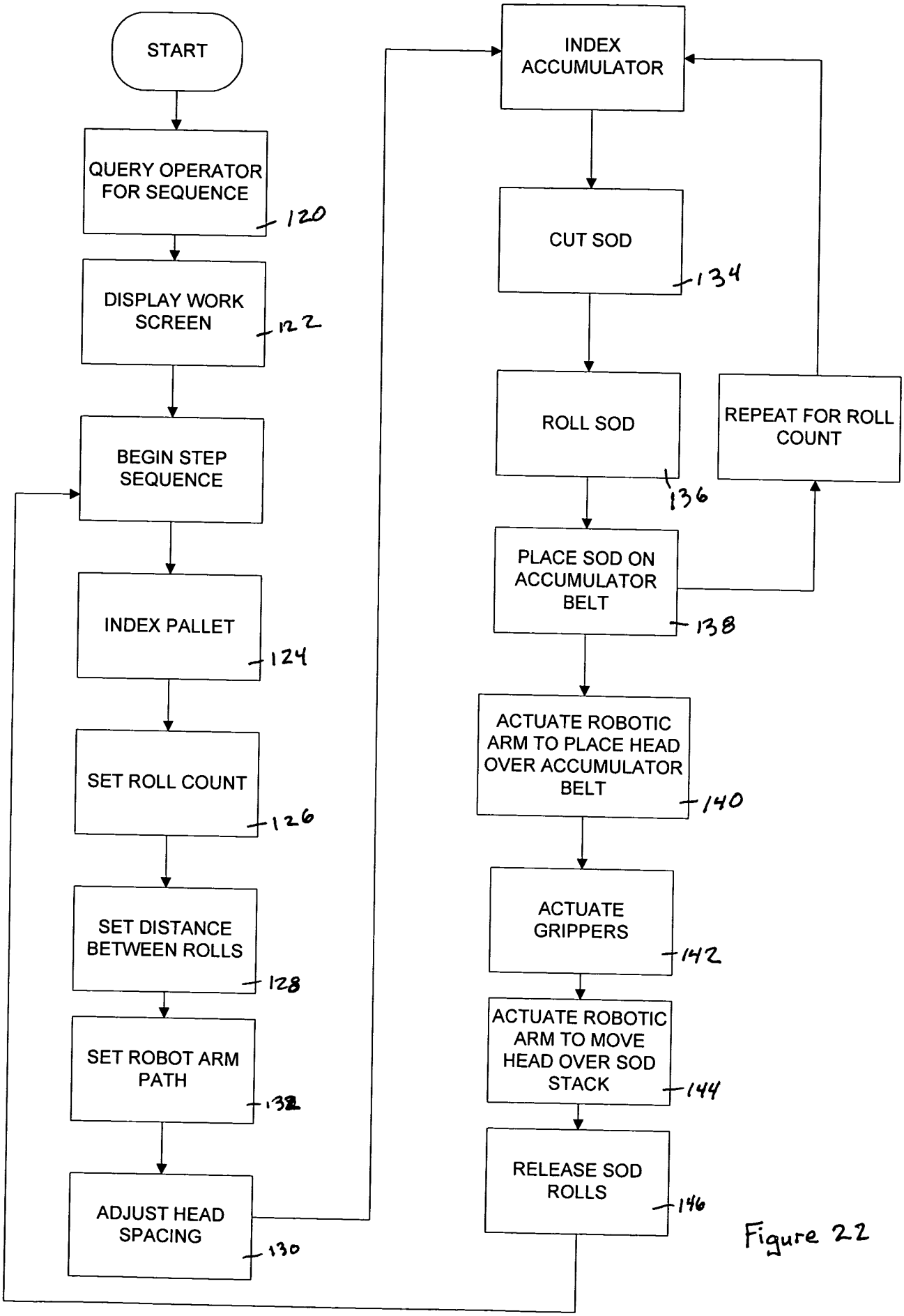

START
QUERY OPERATOR FOR SEQUENCE
120
DISPLAY WORK SCREEN
122
BEGIN STEP SEQUENCE
INDEX PALLET
124
SET ROLL COUNT
126
SET DISTANCE BETWEEN ROLLS
128
SET ROBOT ARM PATH
132
ADJUST HEAD SPACING
130
INDEX ACCUMULATOR
CUT SOD
134
ROLL SOD
136
REPEAT FOR ROLL COUNT
PLACE SOD ON ACCUMULATOR BELT
138
ACTUATE ROBOTIC ARM TO PLACE HEAD OVER ACCUMULATOR BELT
140
ACTUATE GRIPPERS
142
ACTUATE ROBOTIC ARM TO MOVE HEAD OVER SOD STACK
144
RELEASE SOD ROLLS
146

Figure 22

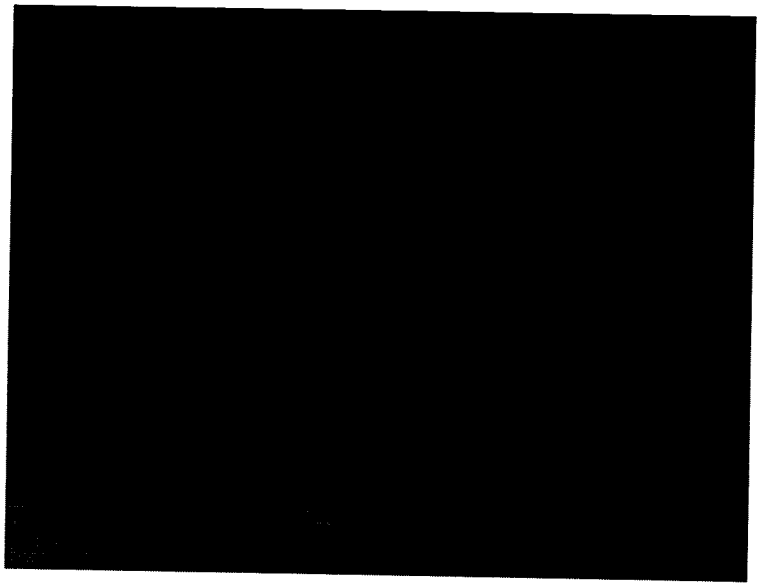


Figure 23a

Figure 23b

Figure 23c

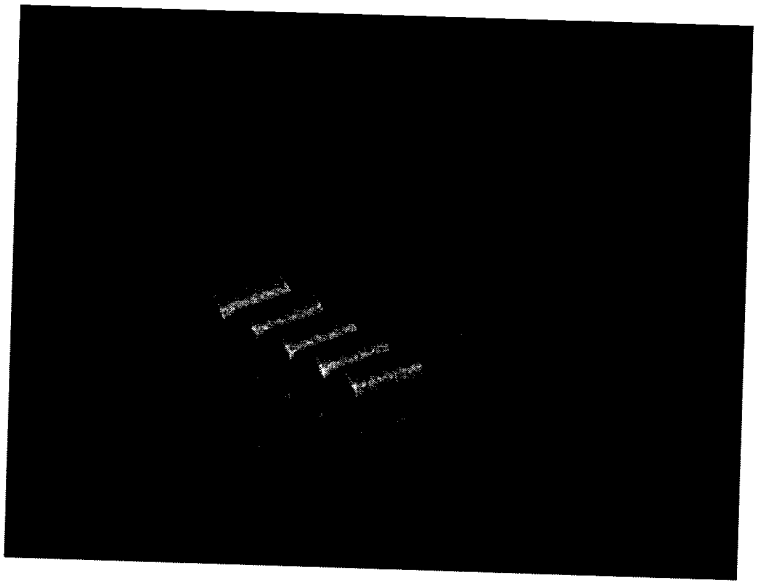


Figure 23d

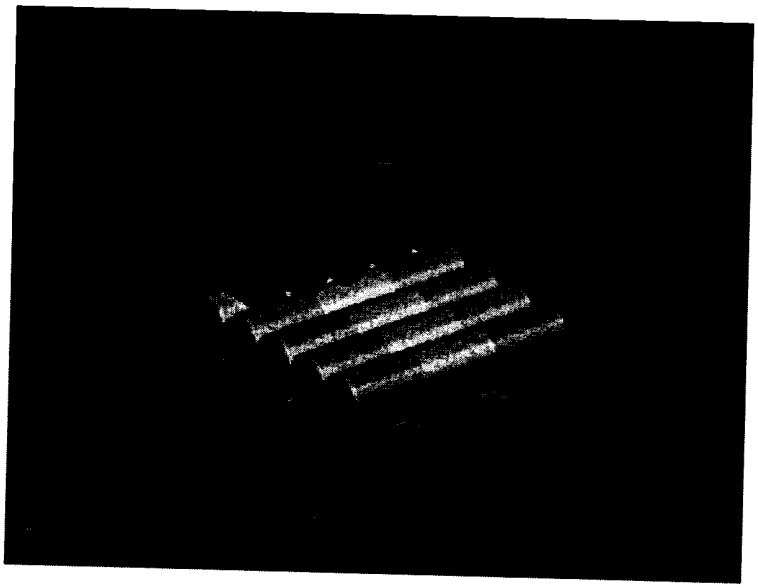


Figure 23e

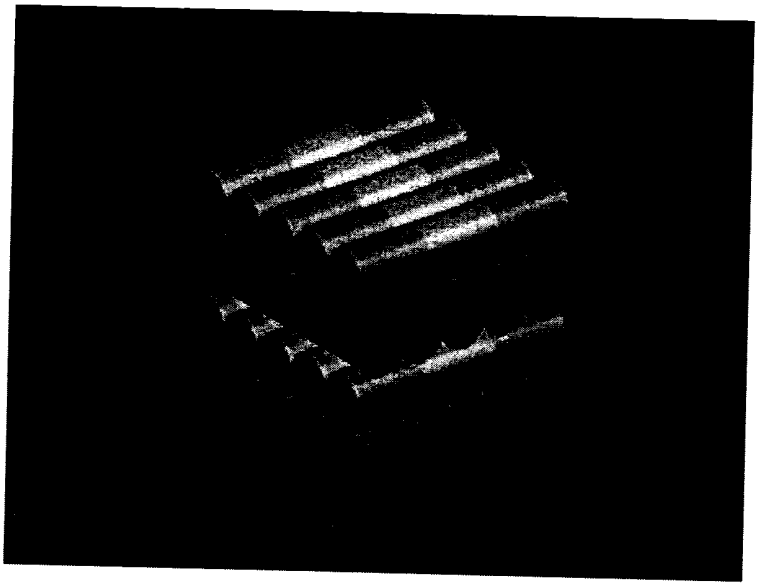


Figure 23F

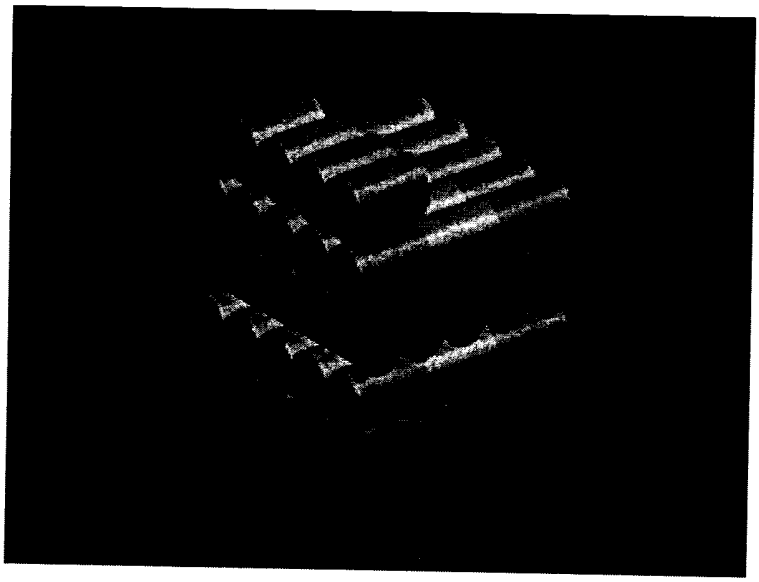


Figure 23 g

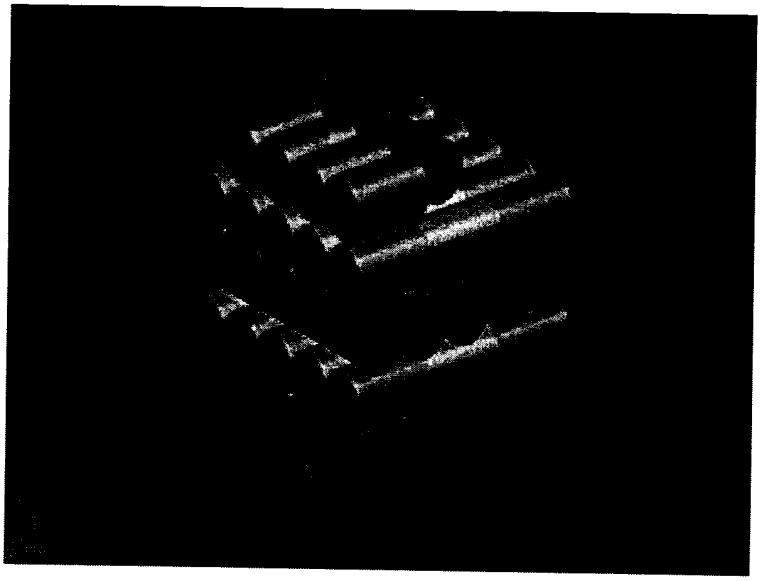


Figure 23h

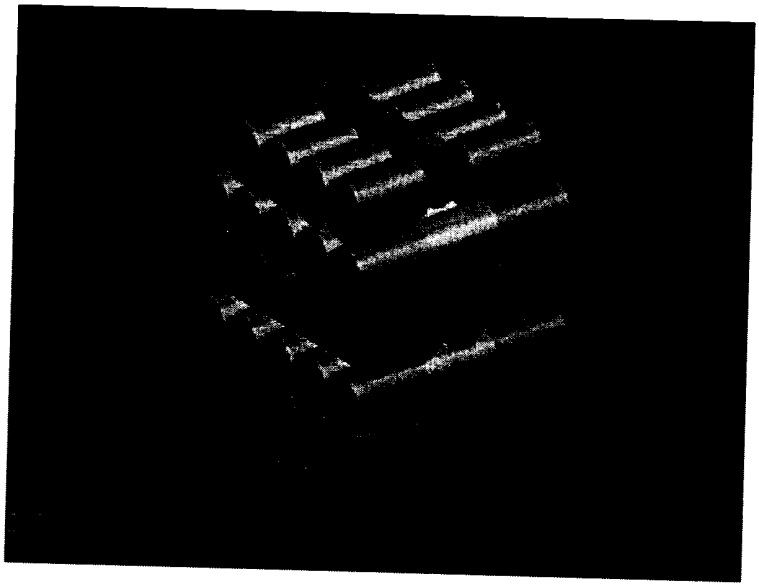
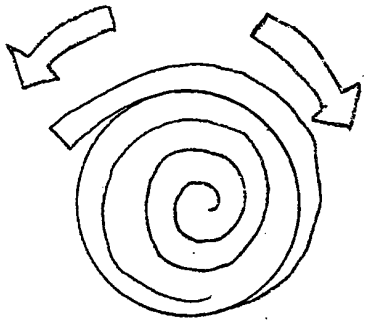


Figure 23i

Figure 24



Sod Roll Flap Adjust

Sod Roll Flap Adjust must be displayed at all times in work screen.